Amendments to the Claims:

Please amend claims 1, 4-9, 11, 12, 15, 16, 18-20, 22-24, 26, 28, 30-32, 35-38, 40-42, 44-46, 48, 50, 52, 57, 59-61, 63-65, 68-71, 73-75 and 77-80 and cancel claims 2, 3, 10, 13, 14, 17, 21, 25, 29, 33, 34, 39, 43, 47, 51, 56, 58, 62, 66, 67, 72 and 76 as shown in the listing of claims below. This listing of claims will replace all prior versions and listings of claims in the application.

1. (currently amended) A method for high-speed transmission of information data on an optical channel, the method comprising:

encoding information via a trellis encoder to produce digital multilevel symbols;

equalizing the digital multilevel symbols to compensate for characteristics of the optical channel;

converting the digital multilevel symbols into analog multilevel signals; and

transmitting the analog multilevel ~~symbols~~ signals over an optical channel.

2, 3. (cancelled)

4. (currently amended) The method of claim ~~2~~ 1 wherein equalizing the digital multilevel symbols comprises precoding the digital multilevel symbols using a Tomlinson Harashima precoder.

5. (currently amended) The method of claim ~~2~~ 1 wherein equalizing the digital multilevel symbols comprises precoding the digital multilevel symbols using a dynamic limiting precoder.

6. (currently amended) The method of claim 1 wherein ~~the converting the digital multilevel symbols to analog multilevel symbols~~ the information that is encoded comprises input bits and wherein encoding the information includes mapping the ~~digital multilevel symbols~~ input bits into ~~a subset mapper~~ digital multilevel symbols.

7. (currently amended) The method of claim 1 wherein transmitting the analog multilevel ~~symbols~~ signals over an optical channel comprises modulating the intensity of a light source

according to the level of the analog multilevel ~~symbols~~ signals.

8. (currently amended) The method of claim 1 wherein transmitting the analog multilevel ~~symbols~~ signals over an optical channel comprises modulating laser intensity according to the level of the analog multilevel ~~symbols~~ signals.

9. (currently amended) A method as in claim ~~2~~ 1 wherein equalizing the digital multilevel symbols to compensate for the laser and channel characteristics comprises:

characterizing the channel; and

applying an inverse characterization of the channel to the digital multilevel symbols.

10. (cancelled)

11. (currently amended) A method for high speed transmission on an optical channel, the method comprising:

accepting information from a plurality of sources;

encoding the information via a plurality of trellis encoders to produce a plurality of digital multilevel symbols;

equalizing the plurality of digital multilevel symbols to compensate for characteristics of the optical channel;

converting the plurality of digital multilevel symbols into a plurality of analog multilevel signals; and

transmitting the analog multilevel ~~signal~~ signals by time division multiplexing the plurality of analog multilevel signals onto an optical channel.

12. (currently amended) A method as in claim 11 wherein ~~converting the plurality of digital multilevel symbols to analog multilevel symbols further~~ the accepted information comprises input bits and wherein encoding the information comprises:

mapping the input bits into digital multilevel symbols ~~digital multilevel symbols in a subset mapper; and~~

~~forming analog multilevel symbols by providing analog representations of mapped multilevel signals~~.

13, 14. (cancelled)

15. (currently amended) The method of claim ~~13~~ 11 wherein equalizing the digital multilevel symbols comprises precoding the digital multilevel symbols using a Tomlinson Harashima precoder.

16. (currently amended) The method of claim ~~13~~ 11 wherein equalizing the digital multilevel symbols comprises precoding the digital multilevel symbols using a dynamic limiting precoder.

17. (cancelled)

18. (currently amended) The method of claim 11 wherein transmitting the analog multilevel ~~symbols~~ signals over an optical channel comprises modulating the intensity of a light source according to the level of the analog multilevel ~~symbols~~ signals.

19. (currently amended) The method of claim 11 wherein transmitting the analog multilevel ~~symbols~~ signals over an optical channel comprises modulating laser intensity according to the level of the analog multilevel ~~symbols~~ signals.

20. (currently amended) A method as in claim ~~12~~ 11 wherein equalizing the digital multilevel symbols to compensate for the laser and channel characteristics comprises:

characterizing the channel; and

using an inverse characterization of the channel to modify the digital multilevel symbols.

21. (cancelled)

22. (currently amended) The method of claim 11 wherein converting the plurality of digital multilevel symbols into a plurality of analog multilevel signals comprises:

accepting the plurality of multilevel symbols successively into a single analog to digital converter; and

successively converting the plurality of symbols into analog multilevel ~~symbols~~ signals.

23. (currently amended) The method of claim 11 wherein converting the plurality of digital multilevel symbols into a plurality of analog multilevel signals comprises:

accepting the plurality of multilevel symbols successively into a plurality of analog to digital converters; and

converting the plurality of symbols into an analog representation; and

successively combining the analog multilevel ~~symbols~~ signals into a succession of analog multilevel ~~symbols~~ signals.

24. (currently amended) A method of receiving data from an optical channel, the method comprising:

accepting a multilevel optical signal from the channel into an optical to electrical converter;

converting the multilevel signal into an analog electrical signal;

converting the analog electrical signal into a digital signal;

equalizing the digital signal; and

decoding the digital signal in a trellis decoder.

25. (cancelled)

26. (currently amended) The method of claim ~~25~~ 24 wherein equalizing the digital signal comprises applying a decision feedback equalization to the digital signal.

27. (original) A method as in claim 24 wherein converting the analog electrical signal to a digital signal comprises:

successively sampling the analog electrical signal; and

converting the successive samplings into a plurality of parallel digital values.

28. (currently amended) A method of signaling over an optical channel, the method comprising:

accepting data from a source;

trellis encoding the data;

equalizing the data;

coupling the equalized encoded data into an optical channel;

conveying the data over the optical channel;

accepting data from the optical channel;

decoding the data accepted from the optical channel; and

providing the decoded data to an interface.

29. (cancelled)

30. (currently amended) A method as in claim ~~29~~ 28 wherein equalizing the data comprises applying a Tomlinson-Harashima precoding to the data.

31. (currently amended) A method as in claim ~~29~~ 28 wherein equalizing the data comprises applying a dynamic limiting precoding.

32. (currently amended) An apparatus for transmitting information on an optical channel, the apparatus comprising:

a trellis encoder for accepting digital information and producing digital multilevel signals;

an equalizer that accepts the digital multilevel signals and produces equalized digital multilevel signals;

a digital to analog converter that accepts the equalized digital multilevel signals and produces analog multilevel signals; and

an analog signal to optical converter that converts the analog signal to an optical ~~level~~ signal for coupling into an optical channel.

33, 34. (cancelled)

35. (currently amended) An apparatus as in claim ~~33~~ 32 wherein the equalizer is a Tomlinson-Harashima precoder.

36. (currently amended) An apparatus as in claim ~~33~~ 32 wherein the equalizer is a dynamic limiting precoder.

37. (currently amended) An apparatus as in claim 32 wherein the analog signal to optical ~~level~~ converter includes a laser.

38. (currently amended) An apparatus for concurrently transmitting a plurality of data signals over an optical channel, the apparatus comprising:

a plurality of trellis encoders that accept a plurality of data signals and produce a plurality of digital multilevel signals;

a plurality of equalizers that accept the plurality of digital multilevel signals and produce a plurality of equalized digital multilevel signals;

a converter that accepts the plurality of equalized digital multilevel signals and produces a plurality of analog multilevel signals; and

an optical source that receives the plurality of analog multilevel signals and produces a light output proportional to the level of successive analog multilevel signals for driving an optical channel.

39. (cancelled)

40. (currently amended) An apparatus as in claim ~~39~~ 38 wherein the plurality of equalizers comprise at least one Tomlinson-Harashima precoder.

41. (currently amended) An apparatus as in claim ~~39~~ 38 wherein the plurality of equalizers comprise at least one dynamic limiting precoder.

42. (currently amended) An apparatus for concurrently transmitting a plurality of data signals over an optical channel, the apparatus comprising:

a plurality of trellis encoders that accept a plurality of data signals and produce a plurality of digital multilevel signals;

a plurality of equalizers that accept the plurality of digital multilevel signals and produce a plurality of equalized digital multilevel signals;

an digital to analog converter that sequentially accepts the plurality of equalized digital multilevel signals and produces a plurality of sequential analog multilevel signals; and

an optical source that receives the plurality of analog multilevel signals for driving an optical channel.

43. (cancelled)

44. (currently amended) An apparatus as in claim ~~43~~ 42 wherein the plurality of equalizers comprise at least one Tomlinson-Harashima precoder.

45. (currently amended) An apparatus as in claim ~~43~~ 42 wherein the plurality of equalizers comprise at least one dynamic limiting precoder.

46. (currently amended) An apparatus for receiving data from an optical channel, the apparatus comprising:

an optical to electrical converter for receiving an optical multilevel signal from an optical channel and converting the optical multilevel signal into an analog multilevel electrical signal;

a decoder that accepts the analog multilevel electrical signal and converts it into a digital multilevel signal;

an equalizer for accepting the digital multilevel signal and producing a digital equalized

multilevel signal; and

a trellis decoder that accepts and decodes the digital equalized multilevel signal.

47. (cancelled)

48. (currently amended) The method of claim ~~47~~ 46 wherein the equalizer is a decision feedback equalizer.

49. (previously presented) A method as in claim wherein converting the digital multilevel symbols into analog multilevel signals comprises plurally digital to analog converting the digital multilevel symbols into analog multilevel signals.

50. (currently amended) A method of receiving data from an optical channel, the method comprising:

accepting an optical signal from the channel into an optical to electrical converter;

converting the optical signal into an analog electrical signal;

converting the analog electrical signal into a digital signal;

equalizing the digital signal; and

decoding the digital signal in a digital signal decoder.

51. (cancelled)

52. (currently amended) The method of claim ~~51~~ 50 wherein equalizing the digital signal comprises applying a decision feedback equalization to the digital signal.

53. (previously presented) The method of claim 50 wherein decoding the digital signal further comprises applying a trellis decoding to the digital signal.

54. (previously presented) A method as in claim 50 wherein converting the analog electrical signal to a digital signal comprises:

plurally sampling the analog electrical signal in a plurality of A/D converters; and

converting the samples into a plurality of parallel digital values.

55. (previously presented) A method as in claim 24 wherein converting the analog electrical signal to a digital signal comprises:

plurally sampling the analog electrical signal in a plurality of A/D converters; and

converting the samples into a plurality of parallel digital values.

56. (cancelled)

57. (currently amended) A method of signaling over an optical channel, the method comprising:

accepting data from a source;

multilevel modulating the data;

equalizing the data;

coupling the equalized encoded data into an optical channel;

conveying the data over the optical channel;

accepting data from the optical channel;

decoding the data accepted from the optical channel; and

providing the decoded data to an interface.

58. (cancelled)

59. (currently amended) A method as in claim ~~58~~ 57 wherein equalizing the data comprises applying a Tomlinson-Harashima precoding to the data.

60. (currently amended) A method as in claim ~~58~~ 57 wherein equalizing the data comprises applying a dynamic limiting precoding.

61. (currently amended) A method of signaling over an optical channel, the method

comprising:

accepting data from a source;

multilevel modulating the data;

equalizing the data;

coupling the equalized encoded data into an optical channel;

conveying the data over the optical channel;

accepting data from the optical channel;

converting the data accepted from the optical channel to digital data;

decoding the digital data accepted from the optical channel; and

providing the decoded data to an interface.

62. (cancelled)

63. (currently amended) A method as in claim ~~62~~ 61 wherein equalizing the data comprises applying a Tomlinson-Harashima precoding to the data.

64. (currently amended) A method as in claim ~~62~~ 61 wherein equalizing the data comprises applying a dynamic limiting precoding.

65. (currently amended) An apparatus for transmitting information on an optical channel, the apparatus comprising:

a modulator for accepting digital information and producing digital signals;

an equalizer that accepts the digital signals and produces equalized digital signals;

a digital to analog converter that accepts the equalized digital signals and produces analog signals; and

an analog signal to optical converter that converts the analog signal to an optical ~~level~~ signal for coupling into an optical channel.

66, 67. (cancelled)

68. (currently amended) An apparatus as in claim ~~66~~ 65 wherein the equalizer is a Tomlinson-Harashima precoder.

69. (currently amended) An apparatus as in claim ~~66~~ 65 wherein the equalizer is a dynamic limiting precoder.

70. (currently amended) An apparatus as in claim 32 wherein the analog signal to optical ~~level~~ converter includes a laser.

71. (currently amended) An apparatus for concurrently transmitting a plurality of data signals over an optical channel, the apparatus comprising:

a plurality of modulators that accept a plurality of data signals and produce a plurality of digital signals;

a plurality of equalizers that accept the plurality of digital signals and produce a plurality of equalized digital signals;

a converter that accepts the plurality of equalized digital multilevel signals and produces a plurality of analog multilevel signals; and

an optical source that receives the plurality of analog signals and produces a light output proportional to the level of successive analog signals for driving an optical channel.

72. (cancelled)

73. (currently amended) An apparatus as in claim ~~72~~ 71 wherein the plurality of equalizers comprise ~~a plurality of~~ at least one Tomlinson-Harashima precoder[[s]].

74. (currently amended) An apparatus as in claim ~~72~~ 71 wherein the plurality of equalizers comprise ~~a plurality of~~ at least one dynamic limiting precoder[[s]].

75. (currently amended) An apparatus for receiving data from an optical channel, the apparatus comprising:

an optical to electrical converter for receiving an optical signal from an optical channel and converting the optical signal into an analog electrical signal;

an analog to digital converter that accepts the analog electrical signal and converts it into a digital signal;

an equalizer for accepting the digital signal and producing an equalized digital signal; and

a decoder that accepts and decodes the equalized digital signal ~~producing data~~.

76. (cancelled)

77. (currently amended) The method of claim ~~76~~ 75 wherein the equalizer is a decision feedback equalizer.

78. (previously presented) The method of claim 75 wherein the decoder is a trellis decoder.

79. (currently amended) The method of claim ~~76~~ 75 wherein the equalizer is a decision feedback equalizer and the decoder is a trellis decoder.

80. (currently amended) A method of receiving data from an optical channel, the method comprising:

accepting a multilevel optical signal from the channel into an optical to electrical converter;

converting the multilevel signal into an analog electrical signal;

converting the analog electrical signal into a digital signal;

equalizing the digital signal; and

decoding the digital signal in a decoder.